NOTES

POLLINATION OF *PLATANTHERA DILATATA* VAR. *DILATATA* IN OREGON BY THE NOCTUID MOTH *DISCESTRA OREGONICA*.—Ronald J. Larson, U.S. Fish and Wildlife Service, 801 Gloucester St., Brunswick, GA 31520.

In the Pacific Northwest, the orchid *Platanthera dilatata* (Pursh) Lindley ex Beck var. *dilatata* occurs from sea level to above treeline. It (or its varietal segregates) is especially abundant in montane meadows, fens, and bogs, where it can number in the thousands at a single site. Although very common, surprisingly little is known about its pollination. There have been anecdotal reports of moths being the pollen vectors (Luer, The Native Orchids of the United States and Canada excluding Florida. New York Botanical Garden, 1975), but descriptions of pollination are lacking.

At 1500 hr on 15 July 1990, chance observations of diurnal moths visiting *Platanthera dilatata* var. *dilatata* were made at Three Creeks Meadow (elev. 1950 m) in the Three Sisters Wilderness Area in Deschutes Co., Oregon. At the 1-ha graminoid-dominated fen, >500 orchids were observed in clusters of 2 to >25 plants. Most of the blossoms on the white racemes were open and unpollinated as indicated by the position of the lip (pollinated flowers have a recurved lip blocking the entrance to the spur).

An estimated 15–20 ash-gray, hairy *Discestra oregonica* (Grote) noctuid moths, about 2 cm in length, were seen visiting the blossoms. The moths apparently selected a raceme at random, using visual cues. After landing, a moth probed few-to-many blossoms before moving to a nearby or distant plant. The relatively large size of the moths necessitated grasping several adjacent perianths while feeding. The orientation of the moths while feeding was mostly head up, but other postures were also noted. Probing was sometimes done with the head close to the opening of the spur, and at other times several millimeters distant. Perhaps the amount of available nectar determined both the numbers of flowers probed on a spike and the depth of probing. Gross dissection of several spurs showed that nectar levels varied; some were nearly empty and others were full.

Spur orientation may force moths to insert their mouthparts so that pollination in *Platanthera* is assured (Inoue, Journal of the Faculty of Science, University of Tokyo III 13:285–374, 1983). In general this may be true, but my photographs showed *Discestra oregonica* moths probing using a variety of orientations, suggesting that its proboscis is highly flexible. In fact, one photo showed a moth standing head down and inserting its proboscis around the recurved lip of a previously pollinated flower. The curved spur of *P. dilatata* var. *dilatata* may prevent long-tongued bumblebees from reaching the nectar, since none were observed at the flowers. Nonetheless R.J. bumblebees are known to occasionally pollinate *Platanthera* species (Catling and Catling, Lindleyana 4(2):78–84, 1989; Patt et al., American Journal of Botany 76(8): 1097–1106, 1989).

Although *Discestra oregonica* moths were wary, I observed several of them with pollinia attached to their proboscides. Three moths collected at random had 1 to 5 pollinia attached to the dorsal side of the proboscis, several millimeters from the head. In situ photos showed the pollinium stipe was erect and bent slightly forward, ready to brush against the stigma of another flower.

In *Platanthera dilatata* var. *dilatata,* the paired viscidia are located on the roof and to each side of the rectangular spur opening (0.8–1.0 mm high and 1.2–1.5 mm wide). The elliptical viscidia (approx. 0.15 mm wide × 0.4 mm long) are oriented with the long axis parallel to that of the spur, probably to insure that they become securely attached to an insect's tubular proboscis. After removal, the flat viscidium becomes

concave below. The stigma is located medially on the roof of the spur entrance where pollen would contact it as an upright moth inserts or withdraws its proboscis.

Spur length and orientation were important characters determining insect pollinators of Japanese *Platanthera* spp. (Inoue loc. cit.). *Platanthera* species with short spurs (1–2 mm long) were pollinated by beetles; those with 4–6 mm long horizontal spurs were pollinated by small pyralid moths; those with 10–20 mm long decurved spurs were pollinated by medium-sized noctuid and geometrid moths; and those with >20 mm long spurs, by sphingid moths. In *Platanthera dilatata* var. *dilatata,* the spur is about 10 mm long and decurved; it is pollinated by medium-sized noctuids, which agrees with the observations on Japanese *Platanthera* spp.

A number of moth species may pollinate *Platanthera dilatata* var. *dilatata.* Studies in Sweden showed that one *Platanthera* species was pollinated by 28 moth species, of which 80% were medium-sized noctuids (Nilsson, Bot Notiser 131:35–51, 1978). In Japan, most *Platanthera* spp. were pollinated by at least 2 to 3 insect species (Inoue loc. cit.). This note is the first record of *Discestra oregonica* moths pollinating *P. dilatata* var. *dilatata.* Most likely nocturnal observations or collections of moths near this orchid would provide additional pollinators.

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MICRODISSECTING EQUIPMENT FOR BOTANICAL WORK.—Martin F. Ray, Department of Integrative Biology, University of California, Berkeley, CA 94720.

Securing a botanical specimen is generally a major difficulty when an investigator is dissecting and manipulating small plant material. The delicacy of some plant structures makes them very susceptible to damage by crude instruments or poor cutting techniques. For holding, fingers are relatively large and awkward and can easily ruin fine structures. Holding with the fingers also leaves only one hand free. Double-sided tape has been used, but the specimen is not easily reoriented. Fine forceps are an improvement, yet they also leave only one hand free to operate other instruments. In cutting, a scalpel or a razor blade is usually satisfactory for larger, tougher structures or specimens, but the tendency of a single blade, no matter how sharp or fine, is to put pressure on the tissue being cut. This often results in tearing the specimen or other inability to selectively control the dissection. Since one generally is interested in observing fine details, methods of holding the specimen and manipulating or cutting its delicate parts without undesirable damage are advantageous. This paper describes techniques and equipment for holding and cutting botanical specimens which are useful in fine manipulation under the dissecting microscope. These techniques and equipment are based on those developed primarily for use with insects, and in some medical work.

Specimen holding. For holding the specimen, petri dishes of various sizes filled with a material that allows for pin placement have been used for insect dissection. The smallest type of insect pins, known as "minuten" pins, are very suitable for work with fine plant structures. For example, I have been able to dissect and observe the interior of male florets from *Soliva sessilis* R.&P. (Asteraceae), which are about 2 mm long, using these techniques. Another example is preparation of a dissection of a flower for photography. Even a larger flower can be laid out nicely using minuten pins. Although various types of wax are often used for pin emplacement, the best material I have seen is a form of liquid silicone that is heat cured, marketed as Sylgard 184 Resin by Dow Corning. This material can be left clear or colored with various